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nings has not disproved the existence of local action: he has shown that the behavior of many of the lower organisms in certain instances need not, and in other cases can not, be explained on the ground of such action. It remains for some one to determine whether a stimulus ever brings about a movement by local action instead of by changing the condition of the entire organism.

Unforunately, the author has not dealt rigorously and in an original manner with the concept of reflex action. The definition which he accepts for purposes of description—an invariable reaction to a stimulus—is obviously unsatisfactory, for if one thing is plain it is that no organic reaction is invariable. Had he either formulated a definition in terms of the results of his investigations or simply said there is no such thing as reflex action as commonly conceived and then proceeded with his careful analysis of behavior, there would have been greater gain. The upshot of the whole matter is that Professor Jennings has no unit of action and apparently is not very hopeful of finding one. He has shown that those acts which are commonly called reflex are far from being simple, in many cases, and are never invariable. The question remains, is there a simple, unanalyzable organic process which may be used for descriptive purposes as a unit of action?

By his researches Professor Jennings has made himself the authority on the behavior of unicellular organisms. His book is admirable with respect to material, method of presentation and form. Its present importance can be fairly judged only when one realizes that it undermines the prevalent conception of the nature of the behavior of lower organisms and narrows to a fraction of its present reach the applicability of the most influential theory of the reactions of lower organisms that has ever been proposed. Its future influence will certainly be tremendous, for it is a work which will determine the direction of research as well as mould popular and scientific opinion. It is the most important book on animal behavior that has ever been written.

ROBERT M. YERKES.

HARVARD UNIVERSITY.

The Psychological Principles of Education. HERMAN HARRELL HORNE, Ph.D. New York: The Macmillan Company. 1906. Pp. xiii + 435.

Considering the present stage of psychological science, Professor Horne has essayed a hazardous task. Though not seeking to contribute to pure psychology nor to special educational methods, he does attempt to deduce practical applications and to criticize educational errors by what he conceives to be ascertained and verifiable laws of mind.

There are five main divisions of the book, the thirty-four chapters, however, being numbered consecutively. Part I. is concerned with the general presuppositions of the science of education, being a revision of his discussion of this topic at the World's Congress of Arts and Sciences at St. Louis. The author pleads for a recognition of education as a science, while admitting that it is primarily an art. Accepting history as a science, by analogy education should be. Contrary to Professor Royce, 'universal validity' is not an 'inalienable characteristic of science.' A 'relative,' not an 'absolute pedagogy,' with a growing, not a static ideal, is indeed a normative science, more and more accumulating a 'body of growing knowledge, classified and verifiable.' Thorndike's work is cited as an example of the advancement and rigor in application of exact scientific methods to the problems exclusively educational. Results at present are meager, methods must be perfected and limitations more strictly defined. The pace has been set, however.

In the body of the book one finds a series of attempts to illustrate the desirability and the practicability of 'this transformation of psychological science into pedagogical art.' In the past egregious errors, such as the extravagant insistence upon formal discipline, the undue stress upon memory, etc., were due to the mistaken faculty school of psychologists. Functional and genetic psychology now emphasize safer and more desirable ways of treating the most clearly revealed stages in mental development and organization. Further, emphasis is laid on the necessity of prime consideration for the teachers, *viz.*, that they should appreciate the needs of the growing, even more than of the grown, mind. Thus paving the way, the author in the remainder of the book (Parts II., III., IV. and V.) concerns himself with specific illustrations of how consciously the teacher should use his psychological laws in the actual intercourse of school life, prefacing his specific work with a closing chapter in Part I., in which the theory of formal discipline serves to illustrate how illuminating comprehensive psychological attitude and analysis can be not only in detecting, but in efficiently correcting educational extremes in matters of emphasis.

Part II. treats of intellectual education. In substance, we as teachers have laid undue stress upon certain sensory material, auditory once, visual at another period, and have never quite sufficiently sought for the attainment of the harmonious functioning of our whole sensory apparatus. Seeking also chiefly what contributes primarily to intellectual clarity, certain other sense organs which furnish us chiefly with esthetic material we have complacently neglected. The author goes to the extreme of urging that a definite effort be directed to the rehabilitating of our rudimentary olfactory sense. It is interesting here to compare his position with that of another prominent educational psychologist. Bagley, in his 'Educative Process' (page 52), deplores the very attitude voiced by the above writer. "The harmonious development aim has taken another erratic turn in giving undue prominence to 'sense training,' especially as applied to the lower senses. . . ." "Now the sense of smell has been atrophied in man for a very good reason. . . ."

The other chapters in Part II. deal with the nature, and the principles of application deduced therefrom, of perception, apperception, memory, imagination, conception, judgment and reasoning. Fads are attacked, errors due to faulty psychological concepts are exposed, and suggestions of conditions for the teacher's equipment and for the pupil's appreciative understanding are carefully enumerated and psychologically justified.

Part III. is concerned exclusively with what pertains to the principles of 'educating the mind to feel.' The striking thing in this chapter is the contention that the training of the feelings should be the conscious, definite aim of the teacher, and that our affective experience is also amenable to methodical exercise. This, however, constitutes the chief value of the treatment for the psychologists as such. The details of the discussion here reveal the author's ethical rather than his psychological acumen. His description, classification and partially adverse criticism of modern theories of feeling are not exhaustive nor do they constitute a satisfactory résumé of the even now 'darkest chapter in psychology.' The concluding chapter on 'Esthetic Education' is naturally nearer to modern psychological issues. His practical suggestions are good and timely.

Part IV. deals with the function, importance, nature and development of the will. Using will in the broad sense, the author includes spontaneous, reflex, instinctive, impulsive, imitative, suggested, habitual and attentive or chosen action as serviceable types, all but the two first named falling under the influence of the educator, and all likewise amenable to a psychological plan of development. Using James's types of wills, the writer claims that our modern kindergarten is adapted to the development of the 'obstructed,' but fashioned so as to be actually detrimental to the equally common type of 'precipitate' will. This, however, is but a sample of the many short-sighted educational policies, cited continually throughout the book, adopted unadvisedly by our educational system builders, whose point of view is limited by their correspondingly limited psychological horizon. There follows a decidedly interesting ethical discussion. The concluding topic of Part IV. deals with attention. A teacher with sufficient psychological erudition and insight will not exclusively follow the child's unguided interest, nor unreservedly call for effort, two marked extremes from the one to the other of which, again from lack of psychological balance, the educational pendulum still continues to swing.

Part V., the concluding division of the book, deals with the problem of the religious consciousness, and the legitimate and practical means for its development. The psychology of religion has also its message for the educator. James, Starbuck, Leuba, Höffding, Hall, Coe, Martineau and many others are drawn upon, with the purpose in view of showing, from the organic nature of self, and from the teachings of genetic psychology, the logical and natural last step of consciously directed educational effort. This from scientific grounds must be incorporated into our educational ideals. Without this specific recognition, based on psychological as well as on ethical and religious assurance, the efforts of education are but makeshifts, futile as tested by the only norm our developed national consciousness should recognize. Religion, in other words, is not 'an artificial graft into human nature,' nor is it merely the 'safe passing of an adolescent crisis.'

A criticism from a strictly psychological point of view is hardly applicable, since the author disavows any intention of contributing to the science. However, the psychologist is naturally interested also in what can be successfully taken over into practise from his chosen field of investigation and experimentation; and it is true also that many look askant at such endeavors as premature and as relying upon questionable speculation rather than upon approved and established fact.

Again the necessity of rather dogmatic and brief summaries and definitions of mental processes tends often to show haste and lack of scientific exactness in their formulation. For an example of this, on pages 166–7 we read: "A sensation is a response of intelligence to stimulation; perception is the repeated response of intelligence to sensation; conception is the response of intelligence to repeated perception; memory and the reproductive imagination are the response of intelligence to its past; and the productive imagination is the response of intelligence to the future or to ideal values." Besides the failure here adequately to represent the immense complexity of the processes referred to, the account may be construed as even misleading. It would be profitable here again for the student of the book to compare the above cited paragraph with the description given by W. McDougall of the same processes, in his excellent little book, 'Physiological Psychology.' Every phrase of the above would be essentially modified. To quote once more, such statements as we find on page 195, "The nerve-centers that correspond to feelings develop earlier than those that correspond to rational thought and deliberate action, . . ." and on page 259, "The roots of will are very much lower down in the nervous system of man than we ordinarily suppose," might lead the trusting reader, uninitiated into the unsettled state of present neurological inquiry into the functions of higher and lower centers, to conclude that our knowledge is much further advanced than actually is the case.

Notwithstanding these and other similar criticisms that might be offered, the author's purpose as outlined in his preface is never compromised. If his title is not taken too literally, if the reader is willing to admit the inclusion of ethical and religious considerations, not to be too insistent that the treatment indicate one consistent attitude, the book is likely to prove profitable and entertaining. Educational factors are varied and widely dispersed, poorly organized, wrongly directed, and some of them often entirely overlooked. This the author sees, and for this he seeks the principles of correction, wherever they seem most likely to be found. He has stressed the importance of the science of psychology, but quite frankly states as another prefatory remark that valuable contributions are looked for from the other sciences as well, though not perhaps in the same proportion.

CHARLES HUGHES JOHNSTON.

DARTMOUTH COLLEGE.